REMARKS

After entry of this Amendment, claims 1-6, 8-14, 19-28, 54-59, 61-67, 70, 72,-88, 95, 98-101, 104, 105, and 107 are pending in this application. Claims 1, 9-14, 19, 20, 54, 62-67, 70, 72, 73, 78, 83, 95, 98-101, and 104 are amended without introduction of new matter. Support for the amended claims is self-evident or provided below. Initially, Applicant notes that claims 54-59, 61,-67, 70, and 72-77 are presently withdrawn. However, as these claims are addressed by the outstanding Office Action, they are also addressed in the remarks below.

In the Office Action, claims 1-6, 8-14, 16-28, 54-59, 61-67, 69-90, and 94-109 stand rejected under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 6,690,423 to Nakamura, or in the alternative under 35 U.S.C. 103(a) as obvious over Nakamura. This rejection is respectfully traversed.

Independent claim 1 recites, "an implant region of a second conductivity type, said substrate region and implant region forming a junction for generating charge in response to light, said implant region including a first portion extending underneath a majority of said junction, having a lower boundary in said substrate, and extending further towards a region of said substrate beneath said gate than a second portion of said implant region extends towards said region beneath said gate, said second portion adjacent to and substantially underneath said first portion such that said lower boundary of said first portion forms an upper boundary for at least a part of said second portion, said second portion extending underneath a majority of said junction, and a third portion extending further towards said region of substrate beneath said gate than said first and second portions extend toward said region beneath said gate to increase charge transfer from said implant region to said floating diffusion region when said gate is switched on and having a donor concentration of said second conductivity type less than said first and second portions to reduce short-channel effects or punch-through between said implant region and floating diffusion region when said gate is switched off." Non-limiting support for the amended language of claim 1 is provided at least by Applicant's Figure 3D and its written description.

The Office Action cites region 52 of Nakamura's Figures 14B and 19 as teaching the third extending portion of the claimed invention. In regards to the third extending portion, the Office Action states: "Recitations of one donor concentration being less than the other is not

considered patentable as there is no magnitude claimed and slight deviations of concentrations are expected in Nakamura for real devices. Note also [Nakamura's region] 52 overlaps [region] 40 and therefore can have greater concentration." Office Action, August 23, 2007, page 3. Amended claim 1 recites limitations addressing these comments.

First, claim 1 recites a magnitude of difference between the donor concentrations of the third extending portion and the first and second portions, as follows: "a third portion extending further towards said region of substrate beneath said gate than said first and second portions extend toward said region beneath said gate to increase charge transfer from said implant region to said floating diffusion region when said gate is switched on and *having a donor concentration of said second conductivity type less than said first and second portions to reduce short-channel effects or punch-through between said implant region and floating diffusion region when said gate is switched off*." Even assuming *arguendo* that real devices of Nakamura would be expected to show slight deviations between the donor concentrations of regions 40 and 52, Nakamura does not teach such a deviation capable of reducing short-channel effects or punch-through.

Second, though Nakamura's region 52 overlaps region 40 and could therefore produce a greater donor concentration in the overlapping region than in the extending portion 40, the overlap is provided to ensure that the regions 52 and 40 are in contact with one another. There is no indication that the overlapping and extending regions would exhibit a difference in donor concentrations that reduces short-channel effects or punch-through, as claimed. Furthermore, the overlapping region cannot teach the recited first and second regions because it does not extend underneath a majority of the p-n junction of Nakamura's photodiode, as claimed.

In view of the above limitations, Applicants submit that independent claim 1 patentably distinguishes over Nakamura. As claims 1-6, 8-14, 16-28, 54-59, 61-67, 69-90, and 94-109, (i.e., independent claims 1, 54, 78, 95,and 104) recite the above limitations, Applicants submit that all claims patentably distinguish over Nakamura, as well. Accordingly, Applicants respectfully requests that this rejection be withdrawn and the claims allowed.

As all outstanding issues are addressed by this response to the outstanding Office Action, favorable reconsideration and allowance are solicited. If, however, there are remaining issues

which can be addressed by a discussion with Applicants' representative, the Examiner is respectfully requested to contact the undersigned attorney, Steven Dickey, at (202) 420-4756. Further, if there are any additional charges in connection with this filing, the Examiner is respectfully requested and authorized to charge Deposit Account No. 04-1073 therefor under Order M4065.0660/P660.

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Respectfully submitted,

By _____

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